

DEPARTMENT OF PSYCHOLOGY

# **Creativity and Psychological Safety**

**A proposed model on the links between psychological safety, ambiguity tolerance, playfulness and creativity**

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## Table of Contents

Abstract	4
Creativity and Adult Playfulness	5
Creativity	6
The Creative Environment	7
Playfulness	8
Play	8
Playfulness	9
Ambiguity Tolerance	11
Psychological Safety	12
Linking the Concepts Together	14
Proposed Model	16
Objectives	17
Method	17
Participants	17
Materials	18
Work Climate Questionnaire	18
Short Measure of Adult Playfulness Scale (SMAP)	18
Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II)	19
Team Psychological Safety Scale	19
Procedure	19
Analysis	20
Item Reliability Analysis	21
Principle Component Analysis (PCA)	21
Comparison of Means	22

Results	22
Descriptive Data	22
Hypothesis 1	22
Hypothesis 2	23
Structural Equation Modeling (SEM)	23
Hypothesis 3	25
Discussion	25
Hypothesis 1	25
Hypothesis 2	27
Hypothesis 3	28
Limitations	28
Conclusion	29
References	30
Footnotes	38
Appendices	39
Appendix A Work Climate Questionnaire English version	39
Appendix B Work Climate Questionnaire Swedish version	40
Appendix C Short Measure of Adult Playfulness English version	41
Appendix D Short Measure of Adult Playfulness Swedish version	42
Appendix E Multiple Stimulus Types Ambiguity Tolerance Scale-II English version	43
Appendix F Multiple Stimulus Types Ambiguity Tolerance Scale-II Swedish version	44
Appendix G Team Psychological Safety Scale English version	45
Appendix H Team Psychological Safety Scale Swedish version	46
Appendix I List of items from the Work Climate Questionnaire within each concept	47

### Abstract

Creativity has been of research interest for centuries and its relationship with other constructs has been established; however, these links mostly study creativity with a single other construct. The purpose of this study was to investigate the relationship between psychological safety, tolerance of ambiguity, playfulness and creativity; they have been individually linked together but no complex model encompassing them all is known to the author. The study tested a proposed model that links the four concepts together. Data was collected from 90 participants in two adult education schools in Sweden. The constructs were measured by Swedish translations of the Team Psychological Safety Scale, the Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II), the Short Measure of Adult Playfulness Scale (SMAP) and the Work Climate Questionnaire. The link between psychological safety and creativity and between ambiguity tolerance and playfulness were the strongest. Psychological safety significantly contributed to creativity even when playfulness and ambiguity tolerance were controlled for. The discussion includes the role of psychological safety in understanding creativity, possible limitations and suggestions for future research directions.

*Keywords:* organizational creativity, play, adult playfulness, ambiguity tolerance, psychological safety, theoretical model

### Creativity and Adult Playfulness

Creativity defines the world we live in to a large extent, and playfulness is closely related to it, but empirical evidence on the characteristics of this relationship is limited. Research and intuition suggest that playful ideas contribute to creative products. Imagine life without all the things that are the product of the creative mind, and you will find humanity naked in a primeval forest. Each culture and civilization is defined by the accumulation of creativity, thus the unique nature of their accumulation distinguishes each society from all others (Simonton, 2006). Given the universality of human creativity, it is not surprising that the topic attracts universal interest from academics and laymen alike. Consequently, in nations with strong scientific traditions this interest almost invariably inspires research on creativity as a phenomenon.

Play is a form of behavior that is readily and easily understood in experiential terms. We all play, and know what play is, whether it be at work or in leisure, alone or with others, with objects, processes, or ideas. We recognize expressions of play in the world around us, and we are aware that play occupies social spaces of cultural and economic significance, such as theaters, cinemas, contests, sports, virtual games, games of chance, amusement parks, toys, and hobbies. While play as an experience is familiar to us, play as a topic of inquiry is among the vaguely studied and understood adult behaviors. Despite the role of play in society, and despite the fact that social sciences have long associated it with individual and social creative functioning, play usually appears in literature only as an auxiliary ill-defined construct. As a result, a number of important questions have not yet attracted much research attention, such as the elements and manifestations of play or its relation to other constructs related to creativity. There is little published work on these issues, and a lack of conceptual framework and research agendas on the nature and role of play in the organizational domain (Mainemelis, & Ronson, 2006). Play benefits organizational creativity through increased task engagement as well as by allowing temporary suspension of organizational objectives (Mainemelis, & Ronson, 2006). The general link between play and creativity was identified early in psychology (Freud, 1926) but there is still little known about the mechanisms of play as an aspect of organizational behavior, or as a source of creativity, thus it remains one of the least understood behavioral phenomena in organizations.

The importance of examining adult playfulness is suggested by abundant evidence indicating that playfulness is part of the normal personality (e.g., Barnett, 1990, 1991; Barnett, & Kleiber, 1982, 1984; Cattell, 1950, 1979; Lieberman, 1977; Singer & Rummo, 1973;

Singer, Singer, & Sherrod, 1980). Regardless, little empirical research on adults' playfulness has been forthcoming, and virtually none is directed towards playfulness in the workplace. One explanation may lie in our conceptions (or misconceptions) of play as being marginal to adult life and work. However, there is ample evidence that work does not preclude play and, in fact, playfulness may be part of the fabric of organizational life (Roy, 1960; Csikszentmihalyi, 1975; Csikszentmihalyi, & LeFevre, 1989). Playfulness at work has important organizational implications. Research has shown that playful behaviors at work can alleviate boredom, release tensions, prevent aggression, and improve workgroup cohesion and solidarity (Bowman, 1987). Playfulness often results in both individual and organizational learning (Lieberman, 1977; Miller, 1973), adaptation (Blanchard, 1986; March, 1979; Weick, 1979), creativity (Csikszentmihalyi, 1975; Ellis, 1973), community building (Bowman, 1987; Dandridge, 1986), greater attentiveness to quality (Glynn, 1991), and better performance overall (Webster, 1990; Webster, Heian, & Michelman, 1990). Even though work is often considered to be the opposite of play, playfulness might be a factor to consider in work assignments or in the design of different types of training programs (Glynn, & Webster, 1992).

### **Creativity**

Creativity refers to the capacity to produce work that is both original, and adapted to the constraints of the situation (Lubart, 1994; Sternberg, & Lubart, 1995; and Lubart, Mouchiroud, Tordjman, & Zenasni, 2004). It has been described as a new structure of the mind, a new configuration or a new formulation of meaning (Ghiselin, 1963). Creative outcomes viewed as “products” in a broad sense are usually ascribed three types of qualities by researchers, such as Besemer and O'Quin (1987): novelty (uniqueness, newness, originality are other terms used); value (usefulness, appropriateness, resolution), and elegance (synthesis, integration, harmony, balance); however, the most generally accepted criteria nowadays are novelty (especially uniqueness) and value (especially usefulness). According to Sternberg and Lubart (1995), creativity depends on several different components. This multivariate approach proposes that intellectual abilities, knowledge, cognitive style, personality traits, motivation and a favorable environment are important factors for creativity. The presence of each of these components and their interaction allows for the emergence of creativity (Zenasni, Besancon, & Lubart, 2008). Creativity uses four creative criteria in divergent thinking to test and evaluate products, which are the following: (a) fluency (total number of different responses to a stimuli), (b) flexibility (variety of responses based on the changes in meanings, in interpretation, in an object usage, in understanding of a text, etc.), (c) originality

(uniqueness of the response in relation to the responses of the whole sample) and (d) elaboration (the amount of detail in the responses) (Irvin, 1976; Johnson, 1977; Wyrick, 1968). These four scales are the old criteria for evaluating the Torrance Tests of Creative Thinking (TTCT), which was built on Guilford's work and created by Torrance (Trevlas, Matsouka, & Zachopoulou, 2003). In this paper the definition by Simonton (2008) is used because it encompasses what most creativity researchers agree on. This definition states that creativity encompasses the generation of creative ideas that are both original and adaptive for the particular problem or to achieve the aspired goal.

The current study took place in Sweden; therefore specific attention is devoted to creativity research in the area. According to Smith and Carlsson (2006), there is no single Scandinavian view regarding how creativity should be understood. Scandinavians, they believe, pay somewhat more attention to potential, and somewhat less attention to productivity than Americans. Creativity is viewed in Scandinavia as an attitude toward life, and a way of dealing with the challenges life poses. When too much emphasis is placed on creative products, the tendency is to focus on people who seek the limelight, but to ignore those who may be creative in a more reserved and quiet way. Since the definitions of creativity depend on the choice of topic and research method, they are apt to vary between authors and projects. However, it is still obvious that the Scandinavian perspective has its own hallmark of less concern with the eventual utility of the endeavors of creative individuals and more with the basic characteristics of the processes involved, be they socially acceptable, interesting, useful, or not (Smith, & Carlsson, 2006).

**The Creative Environment.** A fair amount of empirical research as well as scholarly speculation has considered the role of environmental factors for creativity. Ekvall's (1983, 1997) definition of the creative environment is relevant when adopting a system's view. Ekvall has defined the climate of a group or organization as a composite of behavior, attitudes, and feelings that characterize life in the organization. The climate is shaped in the daily meetings between members in the organization, and when they are confronted with the structure and processes in the organization or group. Ekvall (1990) created a climate model as part of a research project on organizational conditions that stimulate or discourage creativity and innovation. The model incorporated ten dimensions based on theory, field research and experiences of consultancy in organizational psychology (Ekvall, 1996). The ten factors are *challenge* (the emotional involvement of the members of the organization in its operations and goals), *freedom* (the independence in behavior exerted by the people in the organization), *idea support* (the ways new ideas are treated), *trust/openness* (the emotional safety in

relationships), *dynamism/liveliness* (the eventfulness of life in the organization), *playfulness/humor* (the spontaneity and ease that is displayed), *debates* (the occurrence of encounters and clashes between viewpoints, ideas, and differing experiences and knowledge), *conflicts* (The presence of personal and emotional tensions – in contrast to conflicts between ideas – in the organization), *risk taking* (the tolerance of uncertainty in the organization) and *idea time* (The amount of time people can use – and do use – for elaborating new ideas).

Sahlin (2001) provided further support to Ekvall's dimensions in his book on the philosophy of creativity, where he tried to circumvent the unreliability of the traditional historiography of science. However, he referred to his own experience of what he considered more or less creative environments in academic research contexts, thus his experience is limited and should be treated as such. Nevertheless, his selection of factors that likely aid creative thought and action is undoubtedly of interest to researchers in the field of creativity and his description is highly comparable to Ekvall's ten dimensions (1996). Upon entering the doorway to a creative place, Sahlin first remembers the welcoming warmth, whereas the uncreative atmosphere has an unmistakable smell of death. Creative environments are thus distinguished by openness and generosity. People working in such environments also give evidence of a sense of community, of belonging to a group, even if the participants have very different cultural backgrounds. He believes that without trust and tolerance, the openness to new ideas, which is necessary for creativity, will be in jeopardy. Closely associated with this feeling of trust is a sense of equality, not implying total equalization, but a shared commitment. Sahlin discerned another striking difference between a creative and an uncreative environment: the intellectual acuity and curiosity about life in the creative environment. This presupposes a freedom of spirit that does not feel obliged to dwell on the formal details. What could be particularly important for a creative environment to flourish is good personal contact between members of the research group, implying a sense of security and intellectual fellowship. Ekvall's challenge, debates and conflicts dimensions can be linked to ambiguity, idea support, trust/openness to psychological support, and playfulness/humor to the playfulness notion and Sahlin's description of the creative environment encompasses both ambiguity tolerance and psychological safety.

### **Playfulness**

**Play.** Intuitively, play is simple to recognize even though there is an old philosophical claim that play cannot be defined (Wittgenstein, 1953). Defining play in a scientifically useful manner is difficult as there are different approaches to it. For example, play as trait or state; active or personal play (Sutton-Smith, 1997). On the most basic level, play is an intrinsically



motivated (autotelic) activity free of extrinsic goals or consequences (O'Connor, & LaPoint, 1980), even though extrinsic motivators may often be present in sports, games for learning, and performances, and other activities that include play as a component. Moreover, play may be construed as a modifier for other behaviors rather than as its own behavior (Millar, 1968). This distinction is important, as it establishes that play is not one easily definable behavior, but rather something that can contain a wide range of different behaviors. Work activities can be play as well; even though work is often considered the opposite of play (Gitlin-Weiner, 1998), it is reasonable to assume that work-play is "less" play-like because of its explicit external contingencies (Pavlas, Jentsch, Salas, Fiore, & Sims, 2012).

Brown (2009) defined play as an absorbing and intrinsically motivated activity that is seemingly purposeless and provides enjoyment and a suspension of self-consciousness. Similarly, and building on earlier definitions, Gray (2009) defined play as a structured and voluntary activity, that is of an imaginative and non-serious nature, where means are more valued than ends, and involves an active yet non-stressed frame of mind. Play as a behavioral orientation is defined as consisting of five elements: a) a threshold experience between convention and illusion, b) boundaries in time and space, c) uncertainty-freedom-constraint, d) loose and flexible association between ends and means, and e) positive affect (Mainemelis, & Ronson, 2006).

Play can be an array of diverse activities. With a playful state of mind, just about any activity can become play such as tourism, television, daydreaming, sexual intimacy, literature, academia, kayaking, gossip (Sutton-Smith, 1997). When done playfully, a usually non-playful activity such as giving a lecture becomes play just as a game of baseball ceases to be play once it is taken too seriously (West, Hoff, & Carlsson, in press). A normally mundane work task such as participating in a staff meeting becomes play when the meeting is vitalized with toy guns that shoot foam darts at unusually attentive participants.

The more play criteria an activity meets, the greater the degree of playfulness. Based on the above-mentioned scholars' definitions of play, it is suggested that the elements that define play are that it is self-chosen, fun, frivolous, imaginative, and in some way bound by structure or rules (West, Hoff, & Carlsson, in press). These definitions of play, like earlier definitions in the literature, share the notion of play being a behavioral approach to a task rather than a specific type of game or play activity.

**Playfulness.** Piaget (1962) noted the important role of play in child development, observing that play provides a creative imagination that can be used in later thought and reason. The concept of playfulness as an adult personality construct was formulated by Glynn

and Webster (1992) who defined it as "a predisposition to define and engage in activities in a non-serious or fanciful manner to increase enjoyment". Lieberman (1977) sought to extend her original work with children to adolescents and then to adults, but with less success as the age of the player increased (see also Tegano, 1990). Glynn (1991), and Glynn and Webster (1992) attempted to characterize adult playfulness by asking college students and child care workers to provide descriptors that would distinguish high and low playfulness in the workplace (Glynn, 1991). They found five factors, which they labeled "spontaneity", "expressiveness", "fun", "creative", and "silly" (Glynn, & Webster, 1992). Their conceptualization of playfulness, however, was based on the assumption that play is the opposite of work – an assumption that has been refuted by theoreticians and empiricists alike (Barnett, 2007; Csikszentmihalyi, 1990; Csikszentmihalyi, & LeFevre, 1989; Starbuck, & Webster, 1991). Further support for the existence and the examination of the playfulness as a personality trait was provided by studies conducted by other researchers (Lieberman, 1965, 1966; Singer, & Singer, 1978; Singer, Singer, & Sherrod, 1980). Moreover, in the organizational literature, personality has been shown to affect work attitudes and performance (O'Reilly, 1977; Glynn, & Webster, 1992).

In this investigation, playfulness was examined at the individual level of analysis because conceptualizing playfulness as an individual predisposition parallels trends in the educational and anthropological literatures in which it is argued that "the definition of play should properly lie within the individual" (Barnett, 1991). Although definitions of play differ, there is growing agreement among scholars that there is one unique and essential element, common to all definitions, which is fun (Garvey, 1977). The playful person approaches daily activities, such as work, relationships, and recreation with a predisposition to have fun (Schaefer, & Greenberg, 1997). Adults have been known to demonstrate playful behaviors even when they are engaged in practical or serious activities and in the workplace (e.g., Csikszentmihalyi, 1975; Csikszentmihalyi, & LeFevre, 1989; Roy, 1960), indicating perhaps that work activities might be accomplished quite playfully at times (Bowman, 1987; Glynn, & Webster, 1992). The present paper uses the definitions that encompass the characteristics most researchers agree on. Namely, play is defined as a voluntary non-serious, non-stressful but fun activity, where the process is valued more than the ends. The applied playfulness definition assumes it is a personality trait, a predisposition to engage in activities in a non-serious manner in order to increase enjoyment.

### **Ambiguity Tolerance**

At its heart, ambiguity is the timely absence of information needed to understand a situation or identify its possible future states. Ambiguity is therefore a lack of information beyond risk or uncertainty (e.g., Ellsberg, 1961; Pich, Loch, & DeMeyer, 2002), which requires an awareness of all possible outcomes. Ambiguity tolerance is the ability to perceive ambiguity in information and behavior in a neutral and open way (Tegano, 1990). It is an orientation, ranging from aversion to attraction, toward stimuli that are complex, unfamiliar, and insoluble (McLain, 2009); and this definition is well suited for the present investigation. Usually, the response to ambiguity is aversion, but some people may be attracted to the mystery or cognitive challenge that comes from incomplete information, especially when there is no perceived threat. Ambiguity may also be attractive when there is a possibility that the situation may produce a negative outcome (Viscusi & Chesson, 1999), and when the ambiguity enables some hope of avoiding that outcome. In general, however, ambiguity is a barrier to understanding; if an ambiguous situation requires action on the part of the perceiver, it can feel threatening and cause stress. Because both aversive and attractive orientations seem possible, a definition of ambiguity tolerance should encompass the range between both possibilities, and a scale built on this definition should measure an individual's orientation across that range.

Several situational characteristics can give rise to the perception of ambiguity, but complexity, novelty, and insolubility are basic (Budner, 1962). A complex stimulus overwhelms the perceiver who must sift through a lot of information in order to understand the situation. Novelty, also called newness or unfamiliarity, presents a situation that has been experienced rarely, if at all. Even if parts of a situation are familiar, the way the parts are combined or behave together may be unfamiliar. Insoluble stimuli present conflicts in information that must be resolved if the situation is going to be understood. These conflicts may range from mild incongruities to impossible contradictions and can result in multiple interpretations of the situation (Poesio, 1996).

In psychology and in management, levels of ambiguity tolerance are correlated with creativity, risk-taking, psychological resilience, orientation towards diversity (cross-cultural communication, intercultural competence), and leadership style (Furnham, 1994).

Tolerance/intolerance of ambiguity is generally considered to be a personality trait that corresponds to the way in which an individual tends to perceive and deal with ambiguous situations or stimuli (Furnham, 1994; Furnham, & Ribchester, 1995). Research findings also support the theory that ambiguity tolerance is a trait describing the individual's general

aversion or attraction to perceived ambiguity, and that ambiguity tolerance is related to orientations toward other forms of perceived information inadequacy such as risk and uncertainty (McLain, 2009). Individuals who are tolerant of ambiguity enjoy ambiguous situations, or can at least live with them for some time (MacDonald, 1970). People who are intolerant of ambiguity feel constrained, anxious or tense in ambiguous situations. The converse, ambiguity intolerance was introduced in 1950 by Adorno, Frenkel-Brunswik, Levinson, and Sanford and was defined in 1975 as a “tendency to perceive or interpret information marked by vague, incomplete, fragmented, multiple, probable, unstructured, uncertain, inconsistent, contrary, contradictory, or unclear meanings as actual or potential sources of psychological discomfort or threat” (Adorno, Frenkel-Brunswiel, Levinson, & Sanford, 1975).

The way a person psychologically copes with ambiguous information affects the perception, interpretation, and weighting of cognition. Since a person’s degree of ambiguity tolerance interacts with any situation in which there is too little, too much, or seemingly contradictory information, this trait is linked to many behavioral phenomena (Norton, 1975). The positive role of openness, trust, and tolerance has been emphasized by researchers studying ambiguity tolerance (Smith, & Carlsson, 2006). Ambiguity tolerance has been linked to creativity; individuals with higher ambiguity tolerance exhibit more creative behavior. However, the link between play and ambiguity tolerance has not been the focus of empirical investigations.

### **Psychological Safety**

Psychological safety is a shared belief that the team is safe for interpersonal risk taking; this definition was also used in the present empirical investigation (Edmondson, 1996). In psychologically safe teams, team members feel accepted and respected. When psychological safety is present, team members think less about the potential negative consequences of expressing a new or different idea than they would otherwise. As a result, they speak up more when they feel psychologically safe, and are motivated to improve their team or company (Edmondson, 1999). The term is meant to suggest neither a careless sense of permissiveness, nor an unrelentingly positive affect, but rather, a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up (Edmondson, & Mogelof, 2006). This confidence stems from mutual respect and trust among team members. Perceptions of psychological safety often converge in a team, both because team members are subject to the same set of structural influences and because these perceptions develop out of salient shared experiences.

The construct has roots in early research on organizational change, in which Schein and Bennis (1965) discussed the need to create psychological safety for individuals if they are to feel secure and capable of changing. Team psychological safety is not the same as group cohesiveness, as research has shown that cohesiveness can reduce willingness to disagree and challenge others' views, such as in the phenomenon of groupthink (Janis, 1982), implying a lack of interpersonal risk taking. The term is meant to suggest neither a careless sense of permissiveness, nor an unrelentingly positive affect but, rather a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up (Edmondson, 1999). This confidence stems from mutual respect and trust among team members. Edmondson's (1999) results suggest that team psychological safety is a concept that goes beyond interpersonal trust; the researcher found evidence of a coherent interpersonal climate within each group characterized by the absence or presence of a blend of trust, respect for each other's competence, and caring about each other as people. Nevertheless, building trust may be an important ingredient in creating a climate of psychological safety.

Psychological safety is often confused with other concepts such as trust and psychological mindfulness (Edmondson, 1999). The primary differences between psychological safety and trust are that psychological safety focuses on a belief about a group norm, but trust focuses on a belief that one person has about another. Also, psychological safety is defined by how group members think they are viewed by others in the group, but trust is defined by how one views another (Edmondson, & Mogelof, 2006). Mindfulness is also different than psychological safety in that mindfulness is about being aware of one's surroundings whereas psychological safety is about being respected in a group.

In a more recent study by Edmondson and Mogelof (2006), the effect of trust on business partners' creativity was investigated. Despite the differences between psychological safety and trust, the findings of this study are relevant because the business partners can be treated as groups or individuals likewise. Trust was measured by how willing the partners were in financially investing in a joint development. The results showed that more trustful partners invested higher amounts in the alliance, and there seems to be an optimal level of trust that maximizes creativity and innovativeness (Edmondson, & Mogelof, 2006). If the level of mutual trust is below or above this threshold, creativity declines. The findings suggest that joint development projects should always include explicit trust development activities at the beginning of the project, and that the amount of trust in the joint team should be monitored to avoid the negative consequences of excessive trust (Edmondson, & Mogelof, 2006).

Psychological safety benefits organizations and teams in many different ways. The following are the most widely empirically supported consequences of a team being psychologically safe: a) improves likelihood that an attempted process innovation will be successful; b) increases amount members learn from mistakes, c) boosts employee engagement and d) improves team innovation (Edmondson, 1996; Nembhard, & Edmondson, 2006). Ryhammar's (1996) doctoral thesis on creativity studied how the teachers experienced the organization and functioning of their workplace, with particular interest on those concerning openness and diversity in the sphere of creativity. The results showed that creative people regarded the university as a place of openness and diversity; these terms seem to be related to both psychological safety and ambiguity tolerance, linking the investigated concepts (Ryhammar, 1996).

### **Linking the Concepts Together**

Studies examining playfulness as an aspect of personality have found a positive correlation between playfulness and creativity in adolescence and adult populations (Fix, & Schaefer, 2005; Goldmintz, & Schaefer, 2007). Studying exceptionally creative professionals, Csikszentmihalyi (1996) identified playfulness as an important dimension of the creative personality. More recent research on adult playfulness as a personality trait also supports the link between adult playfulness and creativity (Barnett, 2007; Guitard, Ferland, & Dutil, 2005). Data from a recent online study showed a strong association between adult playfulness and creativity (Proyer, & Ruch, 2011). The effects of play on creativity have also been a focus of experimental research, in which a range of play activities have been found to positively impact creativity (West, Hoff, & Carlsson, in press). Playing physically active video games, (Hutton, & Sundar, 2010), role play games (Karwowski, & Soszynski, 2008), creative drama (Karakelle, 2009), and imagining oneself as a child (Zabelina, & Robinson, 2010) are examples of play activities that have been shown to increase scores on creativity tests.

The link between play and creativity may depend on how the concepts are measured (Tegano, 1990). In one investigation with adults, Graham, Sawyers, and DeBord (1989) studied creativity and playfulness and reported that more playful primary school students were significantly more creative than less playful students. In this study; however, creativity was measured as the cognitive trait of ideational or associative fluency, that is, the ability to generate a hierarchy of ideas, some of which may be described as original or creative. Creativity can be assessed in other ways as well, such as a dimension of an individual's personality. Likewise, playfulness and ambiguity tolerance may also be viewed as dimensions of personality or perhaps even as manifestations of cognitive style. Interestingly, in another

study from the 1980's when creativity was measured as a cognitive trait by Sawyers (1987), where the criterion for creativity was ideational fluency (the generation of original ideas in response to some stimulus), no relation of creativity to playfulness was found after intelligence was partialled out, that is, playfulness may not be associated with creativity when creativity is measured as a cognitive trait.

In the field of adult play, there seems to be a general idea that play will increase creativity regardless of type of play (West, Hoff, & Carlsson, in press). The basis for this assumption can be found in play theorists like Vandenberg (1978) who suggests that the connection between creativity and play not only occurs through possible associations made during the play, but also that play develops a special attitude of a more flexible way of thinking characterized by a search for variation and novel solutions. However, other researchers have found support for the assumption that different types of play may be related to a varying degree or not at all (Dansky, & Silverman, 1973).

It is also important to investigate team factors when assessing the effects of play on creativity, and one such factor is psychological safety. Team psychological safety should facilitate learning behavior and playfulness in work teams because it alleviates excessive concern about others' reactions to actions that have the potential for embarrassment or threat, which creative or playful behaviors often have. If group members respect, feel respected by other team members and feel confident that team members will not hold their potential error against them, the benefits of speaking up are likely to be given more weight. It has been suggested that learning behavior – such as playfulness – occurs if the team has a sufficiently safe environment (Edmondson, 1999).

The ability to cope with unstructured or open-ended situations seems a natural requisite for creativity (Tegano, 1990). Implicit in the description of ambiguity tolerance is its association with creativity. Ambiguity tolerance may be central to the study of creativity as operationalized in the “willingness to accept a state of affairs capable of alternate interpretations, or of alternate outcomes” (English, & English, 1958). In other words, ambiguity tolerance may be a critical link in operationalizing a measurable and understandable personality trait which is central to creative thinking. Vernon (1970) explained that tolerance of ambiguity favors creative thinking and behaviors, such as playfulness, because it enables individuals to strive for more than partial or non-optimal solutions to complex problems. People who tolerate ambiguity may be able to work effectively on a larger set of stimuli or situations, including ambiguous ones, whereas intolerant individuals will avoid or quickly stop treating such information. Tolerance of ambiguity allows individuals to

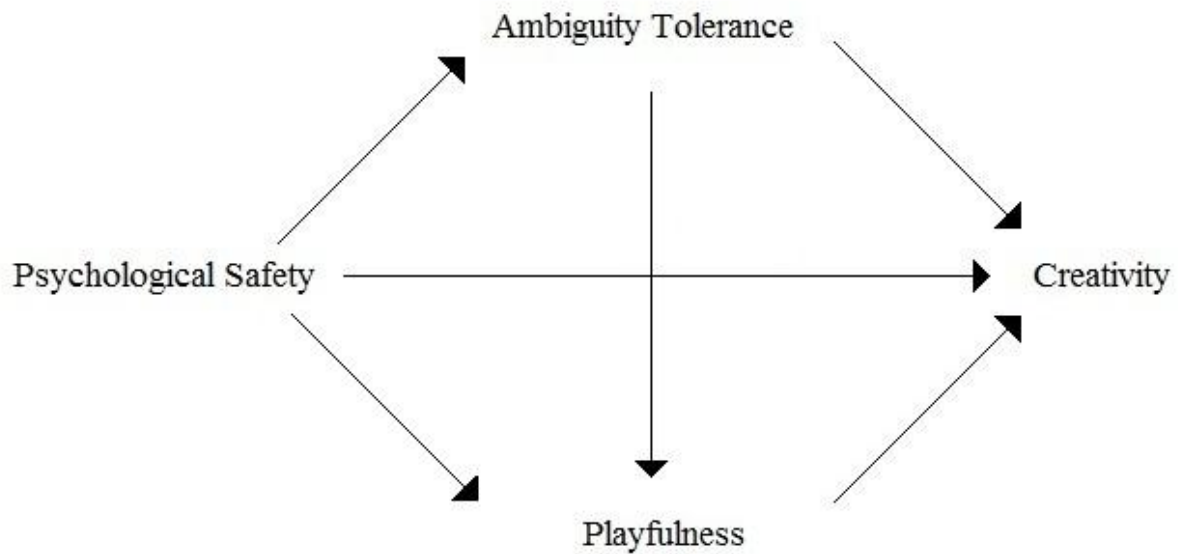
optimize creative potential and attend to more playful behavior, which is not blocked due to unsolved ambiguity. Other authors have suggested that the more an individual tolerates ambiguity, the more creative and playful they are (Barron, & Harrington, 1981; Golann, 1963; Sternberg, & Lubart, 1995; Urban, 2003). This hypothesis is based on the idea that situations requiring creative thinking often involve ambiguity. Tolerance of ambiguity will allow individuals to continue to grapple with complex problems, to remain open, and increase the probability of finding a novel solution.

The capability to tolerate ambiguity is a trait that might augment both creative processes and creative productivity. Individuals who view ambiguity as desirable and challenging may be more likely to engage in problem finding, problem solving and evaluation, avoiding premature decisions throughout the process (Tegano, 1990). Individuals with playful dispositions are guided by intrinsic motivation, an orientation toward process with self-imposed goals, a tendency to attribute their own meanings to objects or behaviors, a focus on pretense and non-literality, a freedom from externally imposed rules, and active involvement (Rubin, Fein, & Vandenberg, 1983). The playful disposition, so described, also would augment the creative process. There exists, then, a theoretical basis for the relationships of tolerance of ambiguity, psychological safety and playfulness with creativity (Tegano, 1990). The nature of the relationship, though, remains unclear and untested in the psychological literature.

### **Proposed Model**

The model below presents the possible connections amongst the four major concepts investigated (see Figure 1.). It is suggested that psychological safety enhances ambiguity tolerance and playfulness so that if a person feels safe to make mistakes, and is accepted by his/her environment, he/she is more likely to be tolerant towards ambiguous situations and will also engage in more playful activities. Ambiguity tolerance and playfulness are believed to be greater in safe group climates because the individual's attention is not intensively directed towards reading cues of the environment on how the others take his/her actions. As outlined earlier, all these three concepts individually have been linked to creativity, which makes ambiguity tolerance and playfulness appear as mediators. Lastly, higher tolerance for ambiguity is also assumed to lead to more playful behavior, because tolerant individuals are believed to attend to more playful behavior, especially when it involves creative thinking.





*Figure 1.* Model outlining proposed connections between psychological safety, ambiguity tolerance, playfulness and creativity.

### **Objectives**

This paper investigates the relationships between creativity, playfulness, ambiguity tolerance and psychological safety as outlined in the proposed model. The advancement in modeling techniques finally gives up the opportunity to understand complex relationships such as those currently studied. The purpose of the present investigation is to test the model and link theory to empirical data with three hypotheses. The first hypothesis is that psychological safety leads to ambiguity tolerance, playfulness and creativity, and the second hypothesis is furthermore that playfulness and ambiguity tolerance lead to creativity. Thus, the main relationship between psychological safety and creativity is predicted to be mediated by playfulness and ambiguity tolerance. The third hypothesis is an additional relationship between ambiguity tolerance and playfulness; higher ambiguity tolerance predicts greater playfulness.

### **Method**

#### **Participants**

Data was collected from 90 individuals (70 women, 20 men) from two adult education schools in Malmö, Sweden. Participants were recruited from classes through their teachers,

who gave prior consent to data collection and informed their students about the study. The mean age of respondents was 33.3 years (age range: 19-57 years,  $SD=9.65$ ) and they reported a mean of 1.8 working years in groups (range: 0.25-12 years,  $SD=2.31$ ). The participants received no compensation for filling out the survey, and they were informed about the general topic of the research. All participants were told to answer the questions related to their most recent school group or work group experience. The questionnaire consisted of a few demographic questions, two pages of statements with Likert scale responses and took on average 15 minutes to complete.

### **Materials**

The four questionnaires used were first translated from English to Swedish, and then back-translated by certified professional translators. These were then compared to the original English versions and adjustments were made in the Swedish translations where necessary. The four sub-questionnaires administered were the Team Psychological Safety Scale, the Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II), the Short Measure of Adult Playfulness Scale (SMAP) and the Work Climate Questionnaire. The different scaling of the measures were adjusted so that the Workplace Cohesion Measure was tested on a 7-point Likert scale and the other three questionnaires were grouped on another page with 5-point Likert scales.

**Work Climate Questionnaire.** The Work Climate Questionnaire was developed by West in 2012 in order to investigate work climate, group safety, group playfulness and group creativity (West, Hoff, & Carlsson, in press). The measure consists of 15 items and responses are scored on a 7-point Likert scale (Appendix A and B). This study is part of a larger currently running study, and is the first to use this scale, therefore reliability and validity indicators were not available prior testing. In this study, the Swedish version had excellent internal consistency with Cronbach's  $\alpha=0.862$  reliability. Two items were found to contribute poorly to the scale with displayed corrected item-total correlations below 0.25 and were subsequently excluded from further analysis (Cronbach, 1951).<sup>1</sup>

**Short Measure of Adult Playfulness Scale (SMAP).** The SMAP consists of five statements that allow for a global assessment of adult playfulness. The measure was developed by Proyer in 2012 and the initial assessment showed satisfactory internal consistency (.80-.89) and validity and demonstrated robust correlations with measures for adult playfulness and the need for play (Proyer, 2012). All items (see Appendix C and D) are positively keyed and the original 4-point Likert scaled was adjusted to the other measures with 5-point Likert scales, where 1=strongly disagree, and 5=strongly agree. In this study, the

scale had excellent internal consistency with Cronbach's  $\alpha=0.808$  reliability. All items were found to strongly contribute to the scale; none were removed.

**Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II).** The MSTAT-II was developed by McLain in 2009 based on a definition of ambiguity tolerance as an orientation, ranging from aversion to attraction orientation and it addresses each basic type of ambiguous stimulus associated with perceived ambiguity: complexity, unfamiliarity, or insolubility; and also items that refer to ambiguous stimuli in general, regardless of type (McLain, 2009). It was chosen over other measures because it reduces references to specific contexts and objects not directly related to ambiguity. The reliability and validity values of the MSTAT-II are higher than the scores of alternative measures, suggesting the potential of the scale to target ambiguity tolerance (McLain, 2009). The measure consists of thirteen statements and the original 7-point Likert scale was adjusted to a 5-point Likert scale to unify the scaling among the three measures and to match the materials of the parallel study (see Appendix E and F). In this study, the Swedish version had excellent internal consistency with Cronbach's  $\alpha=0.828$  reliability. Three items were found to poorly contribute to the scale and so they were subsequently excluded from analysis.<sup>2</sup>

**Team Psychological Safety Scale.** The Team Psychological Safety Scale was developed by Edmondson in 1999 as one scale examining psychological safety and learning behaviors in work teams. The scale consists of seven statements and was scored on a 5-point Likert scale similarly to the previous two measures; this scoring was adjusted from the original 4-point Likert scale (see Appendix G and H). Previous evaluations of the measure showed the survey items capture the existence of team psychological safety and show high internal consistency reliability (Edmondson, 1999). The Swedish version that was used in this study had good internal consistency with  $\alpha=0.604$  reliability. Three items were found to poorly contribute to the scale and were therefore deleted.<sup>3</sup>

### **Procedure**

Members of the same class were tested together and before handing out the questionnaires the study was introduced to the students, they were asked for their informed consent to participate. Also, it was emphasized the answers should reflect their honest opinion not what the researcher might want to see. The participants were asked to fill out a paper-pencil questionnaire that consisted of demographic questions and four sub-questionnaires. The order of the sub-questionnaires was mixed in six different ways comparable to the simultaneously running study, and the number of participants in each category was controlled (15 people per group).

## **Analysis**

Comparison of means analysis was utilized to find possible differences among the six questionnaire categories, the two schools, genders, ages and group working years. Since the study applied a recently developed, unvalidated measure, and because the Swedish translations have not been used before; item reliability analysis was conducted to investigate the homogeneity of the proposed facets and to remove unnecessary items. Given that the Work Climate Questionnaire was utilized to study creativity; and items from the scale were used in the analysis of playfulness and psychological safety as well, principal component analysis was conducted to identify which questions can be grouped together. Correlation among the measures, and the four concepts were studied, and the proposed model was probed by AMOS structural equation modeling (SEM) in order to determine how well the model fits the data and to estimate the structural relations between the latent variables. The factors involved in the SEM confirmatory modeling were creativity, playfulness, ambiguity tolerance and psychological safety. The playfulness, psychological safety and ambiguity tolerance latent variables were modeled by the SMAP, the Team Psychological Safety Scale, and the MSTAT-II, respectively with additional items from the Work Climate Questionnaire. Creativity was studied using the creativity related items determined by PCA from the Work Climate Questionnaire.

Analysis was performed using SPSS and SPSS Amos software. As the first step of assumption evaluation, the accuracy of the data coding was checked and entry into SPSS. Data ranges were inspected for each variable to ensure that all data were entered within the prescribed ranges. These results lead to logarithmic transformation of two variables to reduce skewness and the number of outliers, and to improve the normality, linearity, and homoscedasticity of residuals. One of the transformed variables was later excluded from analysis due to too low corrected item-total correlation score. Items with opposite scoring were reversed and the scales of all questionnaire items were adjusted to a 7-point Likert scale using proportional transformation for easy comparison among measures. The 7-point scale was preferred over the 5-point scale because two measures originally employ this scale and the larger scale allows for more accurate evaluation and variability in responses. The univariate outliers were identified and investigated, no data input mistakes were found, and the outliers were not modified since they were seen as belonging to the population. No cases were identified to have multivariate outliers in the x and y-spaces using Mahalanobis distance

and standardized residuals, respectively; however, four cases were identified with multivariate outliers in the xy-space using Cook's distance scores. Further investigation of these participants revealed they are all from the same school, 2 males and females, all from different questionnaire order groups and they were not tested together on the same occasion. Therefore, they were concluded to be simple unusual values that might suggest other latent variables that should be considered (such as differences between the two schools), so they were kept in the dataset. Multicollinearity diagnostics using the variance inflation factor produced as part of regression analysis showed the presence of no multicollinearity on any of the measures, and no suppressor variables were identified. A missing values assessment was performed and the data was found to be missing completely at random. That allowed for the imputation of all missing data so that the missing values identified were replaced by the variable mean value as no missing values is a prerequisite to conduct structural equation modeling (SEM) analysis. Prior to the correlation, regression and SEM analyses, new aggregate variables were created for the four measures and the four investigated concepts.

**Item Reliability Analysis.** Item reliability analysis was conducted separately on the four sub-questionnaires. The primary focus of the analysis was to assess the homogeneity of the 40 items as scales. All four scales had good or excellent internal consistencies and correlation between items of the different scales was no higher than medium, which does not significantly affect the reliability of the analysis. In total, 32 items were suitable to be included in further analysis.

**Principle Component Analysis (PCA).** The Work Climate Questionnaire was analyzed utilizing PCA in order to identify which items can be grouped together to investigate the constructs of the proposed model. The assumptions for the factor analysis were checked before running principal component analysis, and no violations were found. The correlation matrix was factorable based on Bartlett's test of sphericity being significant and Kaiser-Meyer-Olkin value exceeding 0.6. PCA without rotation revealed the presence of three principal components with Eigenvalues larger than one and these findings were also supported in the scree plot by a break after the third component. The three components explained 64.17% of the variance, the first component accounting for 46.86%, the second for 9.38% and the third for 7.93%. Exploration of the three components revealed that questions related to psychological safety, creativity and playfulness can be grouped together; however, psychological safety loaded high with creativity items as well (see Appendix I for the list of items from the Work Climate Questionnaire within each concept).

**Comparison of Means.** Comparison of means analysis was conducted as a background check in order to target significant differences among the demographic variables and avoid their unaccounted influence in the model. The test revealed significant differences between the schools, gender and age. These significant main effects were for school (1.40);  $t(89)=26.96$ ,  $p<.001$ ; for gender (0.78);  $t(89)=18.18$ ,  $p<.001$ ; and for the age (33.33);  $t(89)=33.34$ ,  $p<.001$ . Further investigation revealed that these differences do not significantly influence the outcome of the regression and SEM analyses.

## Results

### Descriptive Data

The means and standard deviations for the four concepts were investigated; creativity had the highest mean score ( $M=5.32$ ,  $SD=0.9$ ), followed by psychological safety ( $M=5.19$ ,  $SD=0.96$ ), playfulness ( $M=4.98$ ,  $SD=0.86$ ) and ambiguity tolerance ( $M=4.69$ ,  $SD=0.97$ ). A correlation analysis was conducted on the different sub-questionnaires and on the four main concepts. The Team Psychological Safety Scale significantly correlated with all other measures, with the Work Climate Questionnaire,  $r(88)=.57$ ,  $p<.001$ ; with the SMAP,  $r(88)=.22$ ,  $p=.034$ ; and with the MSTAT-II,  $r(88)=.24$ ,  $p=.022$ . Moreover, significant results were found between the SMAP and the MSTAT-II measures,  $r(88)=.26$ ,  $p=.012$ . The direction of correlation was positive in all cases, meaning the higher the score in one domain, the higher the predicted score in the other domain will be.

### Hypothesis 1

The first hypothesis assumes links between psychological safety and ambiguity tolerance, playfulness and creativity. These relationships were first examined using correlation analysis, where significant positive correlations were found between psychological safety and creativity,  $r(88)=.64$ ,  $p<.001$  (see Table 1); meaning the higher a participant scored on psychological safety, the higher they would score on creativity. The same significant prediction was found when the model was controlled for differences between the two schools, genders or ages. Overall, there is a link between psychological safety and creativity, but no link between psychological safety and ambiguity tolerance or playfulness.

Table 1 Correlations between Concepts (N=90)

		Creativity	Ambiguity Tolerance	Psychological Safety	Playfulness
Creativity	Pearson Correlation	1	,088	,644**	,075
	Sig. (2-tailed)		,410	,000	,484
Ambiguity Tolerance	Pearson Correlation	,088	1	,183	,252*
	Sig. (2-tailed)	,410		,085	,017
Psychological Safety	Pearson Correlation	,644**	,183	1	,147
	Sig. (2-tailed)	,000	,085		,166
Playfulness	Pearson Correlation	,075	,252*	,147	1
	Sig. (2-tailed)	,484	,017	,166	

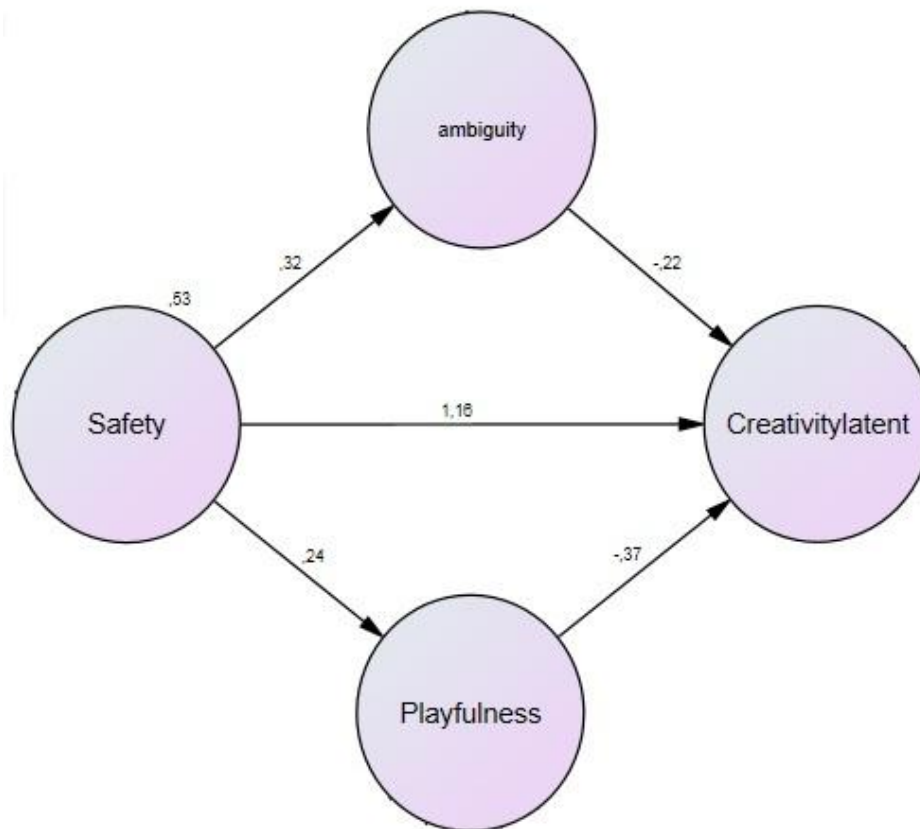
\*\* . Correlation is significant at the 0.01 level (2-tailed).  
\* . Correlation is significant at the 0.05 level (2-tailed).

## Hypothesis 2

The second hypothesis proposes that playfulness and ambiguity tolerance lead to creativity, thus the main relationship between psychological safety and creativity is predicted to be mediated by playfulness and ambiguity tolerance. The results of correlation analysis showed no relationship between creativity and ambiguity tolerance or creativity and playfulness, therefore, conducting multiple sequential regression analysis was unnecessary, no mediation was present (Baron & Kenny, 1986). The link between psychological safety and creativity was only significant. Next, the full model was tested using structural equation modeling to confirm these findings.

**Structural Equation Modeling (SEM).** The full model was probed by AMOS structural equation modeling (SEM) in order to determine how well the model fits the data and to estimate the structural relations between the latent variables. The link between ambiguity tolerance and playfulness was removed due to the complicated path that arrow creates that would hinder the applicability of the program (it would fail to compute the path between psychological safety to ambiguity to playfulness and then to creativity). The factors involved in the SEM confirmatory analysis were creativity, playfulness, ambiguity tolerance and psychological safety (see Figure 2.). The playfulness and psychological safety latent variables were modeled by the independent measures and by added items from the Workplace Cohesion scale; ambiguity tolerance was only studied using the MSTAT-II and creativity was investigated using the creativity related items from the Work Climate Questionnaire. Initially all the items related to any of the constructs were included in the model; however, later only

items from different scales were employed in order to avoid correlation caused by the same scales between the latent variables. Playfulness, psychological safety and ambiguity tolerance latent variables were modeled by the SMAP, the Team Psychological Safety Scale, and the MSTAT-II, respectively. Creativity was studied using the creativity related items determined by PCA from the Work Climate Questionnaire.



*Figure 2.* Structural equation model of the latent constructs with factor loadings. (Standardized Solution; N = 90)

The default model's chi-square statistics were  $\chi^2(60, N = 90) = 88, p = .011$ , meaning there are factors other than chance operating for the deviation. The default model confidence interval score was acceptable, above 90% (CFI=0.922) and the root mean square error of approximation (RMSEA) default model despite the small sample size was slightly above the expected .05 (RMSEA=0.072). Moreover, the PCLOSE value met the expectations by being non-significant;  $p = .135$ , and these results indicate an acceptable model. The parameter estimates and the factor loadings support the previous findings, namely the strong link between the latent variables of psychological safety and creativity; with a score of 1.16. Interestingly; however, these numbers turn negative both between playfulness to creativity



and ambiguity tolerance to creativity, with scores of -0.37 and -0.22, respectively. The only significant regression weight among the latent variables was found between psychological safety and creativity: the probability of getting a critical ratio as large as  $z=3.05$  in absolute value is .002. In other words, the regression weight for psychological safety in the prediction of creativity is significantly different from zero,  $p=.002$ , with regression weight estimate of 0.89,  $SE=.29$ . Overall, the SEM analysis confirmed what had been found during the regression analysis: only psychological safety factors contribute significantly to the prediction of creativity, the other measures did not demonstrate a significant and unique contribution to the model.

### **Hypothesis 3**

The third hypothesis assumes an additional relationship between ambiguity tolerance and playfulness; higher ambiguity tolerance is predicted to lead to greater playfulness. Correlation analysis found significant results between ambiguity tolerance and playfulness,  $r(88)=.25$ ,  $p=.017$ ; the direction of the correlation was positive, thus the higher the ambiguity tolerance score, the higher playfulness score will be. Linear regression analysis was employed to further investigate the relationship: significant result was found for ambiguity tolerance predicting playfulness  $R^2=.06$ ,  $F(1,88)=5.95$ ,  $p=.017$ ; the prediction remained significant when the model was controlled for differences between the two schools, genders or ages. Overall, the analyses confirmed the hypothesis; higher tolerance of ambiguity was found to lead to greater level of playfulness.

## **Discussion**

### **Hypothesis 1**

The hypothesis that psychological safety leads to ambiguity tolerance, playfulness and creativity was partially supported. A very strong link was found between psychological safety and creativity, which was supported by correlation and structural equation modeling. However, the existence of the links between psychological safety and ambiguity tolerance and psychological safety and playfulness were not confirmed by any of the analyses. This finding suggests that psychological safety largely contributes to self-perceived creativity. The questionnaire targeted the creative process, the generation of ideas that are both original and adaptive; it did not evaluate creative products or the outcome of creativity. Thus, the

conclusion that can be drawn is limited to the nature of the self-report measure, and shows that the safer a person feels with peers in his/her environment, the more creativity he/she will report.

Further research should investigate the strength of the relationships between creativity and psychological safety. In this study, the two concepts were very closely linked; however, it is possible that such findings were partially due to the scales that were used or that participants misinterpreted the phrasing of the items related to psychological safety and creativity and responded to them similarly. Different measures of these concepts thus might find a weaker relationship. Interestingly, the results remained the same regardless of whether psychological safety was conceptualized only by the Team Psychological Safety Scale or by the Team Psychological Safety Scale together with items from the Work Climate Questionnaire, thus the strong link cannot be explained by using items from the same questionnaire to measure the two concepts.

Other researchers have established the importance of psychological safety in fostering creativity; their findings are in line with the results of this study (Duan-xu, & Yan, 2010). For example, Ekvall (1996) described that people in the group who feel high level of safety dare to put forward their ideas and opinions, and they take initiatives without fear of being ridiculed or retaliated. Those with low level of safety on the other hand are afraid they could be exploited and their good ideas could be stolen from them (Ekvall, 1996).

The possibility of a bidirectional relationship between psychological safety and creativity also has to be considered. More creative individuals are able to solve problems in novel and adaptive ways, this ability might increase their perception of psychological safety. Although, it is likely that this bidirectional relationship is only present within an optimal level of creativity. This presumption is supported by the findings of Bidault and Castello (2009), who suggest that creativity peaks at a certain level of psychological safety and decreases beyond that threshold. Too little creativity is probably insufficient to enhance perceived psychological safety and too high creativity might be strongly linked to other personality traits, such as susceptibility to develop psychopathologies that hinder feeling safe in one's environment. Specifically, research findings indicate highly creative individuals and creative geniuses are more likely to have psychopathologies of various kinds, such as depression or substance abuse and they are emotionally more unstable than less creative people (Jamison, 1993; Ludwig, 1995; Simonton, 2005). Further research should investigate this bidirectional link, and more specifically investigate the circumstances in which creativity leads to psychological safety and whether the link weakens with highly creative people.

No studies were found that directly examined the relationship between psychological safety and ambiguity tolerance or psychological safety and playfulness. Edmondson (1999) vaguely linked playful behavior to psychological safety, but her main focus was on learning behaviors. Therefore, the finding of this study, that these concepts are not linked does not contradict previous research. There may be several reasons why the links between psychological safety and ambiguity tolerance and psychological safety and playfulness were not significant. One possibility is that the questionnaires used in the study target specific characteristics of the concepts that are not significantly related and different measures would find different results. Furthermore, the studied population might have been too small or there might have been uncontrolled variables that hindered the results. This study deliberately focused on working age adult population, so the results cannot be generalized to all age groups. The findings of this study suggest that there is no relationship between psychological safety, ambiguity tolerance, psychological safety and playfulness, only between psychological safety and creativity.

### **Hypothesis 2**

The second hypothesis proposed that playfulness and ambiguity tolerance would lead to creativity, so it examined the mediating role of playfulness and ambiguity tolerance on the relationship between psychological safety and creativity. The findings rejected this hypothesis completely. There was no relationship found between playfulness, ambiguity tolerance and creativity; correlation was close to zero and the SEM analysis rejected the proposed relationship between the concepts.

The most plausible explanation to why the present study did not find the same significant relationships is that the measure of either or multiple concepts did not sufficiently measure the investigated construct. The SEM analysis showed that the factor loadings between playfulness and creativity and between ambiguity tolerance and creativity are slightly negative, this result was highly unexpected. Furthermore, the SEM analysis postulated that the weak structural relations could be removed from the model. Although, the SEM analysis works more reliably with larger sample size, the relatively small sample size of this study could have hindered the results as well (Kaplan, 1990). The weakest concept in the model was undoubtedly creativity because there was no separate questionnaire employed to study it, only a selection of items were chosen from the Workplace Climate Questionnaire. Most likely those three items on creativity share a lot of similarities with the measure of psychological safety, but are independent from ambiguity tolerance and playfulness. Further studies should investigate the validity of this with a better measure of creativity.

These findings are in contradiction with previous research that has found a positive correlation between playfulness as a personality trait and creativity in adult populations (for example, Fix, & Schaefer, 2005; Goldmintz, & Schaefer, 2007); and studies that have identified playfulness as important for the creative personality (e.g., Csikszentmihalyi, 1996; Ekvall, 1999). Recent studies on adult playfulness as a personality trait also found a strong association with creativity (Barnett, 2007; Guitard, Ferland, & Dutil, 2005; Proyer, & Ruch, 2011). Ambiguity tolerance is also thought to be important for creativity and playfulness (English, & English, 1958; Golann, 1963; Vernon, 1970; Barron, & Harrington, 1981; Tegano, 1990; Sternberg, & Lubart, 1995; or Urban, 2003).

### **Hypothesis 3**

The third hypothesis proposed an additional relationship between ambiguity tolerance and playfulness, and predicted that higher ambiguity tolerance would lead to greater playfulness. This relationship was confirmed by the analysis; both the measures – Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II) with the Short Measure of Adult Playfulness Scale (SMAP) – and the concepts of ambiguity tolerance and playfulness correlated with each other and the ambiguity tolerance scores significantly predicted playfulness scores.

These results support the findings of other researchers; for example, Rubin, Fein, and Vandenberg (1983) and Tegano (1990) believe that individuals who view ambiguity as desirable are more likely to have a greater playful disposition. Future studies should investigate the nature and characteristics of this relationship.

### **Limitations**

The biggest weakness of the present study is that no separate measure was used to study creativity, it was measured only with a subscale within the Workplace Climate Questionnaire. This study is part of other ongoing investigations that use the same measures, and easy comparability among the results of these studies was highly desired. The creativity subscale from the Workplace Climate Questionnaire unfortunately seems to be limited in applicability because it only confirmed the link with psychological safety and not with the other two constructs. It is unclear whether the more connections would have been found with a different creativity measure, future research is necessary to establish that.

The sample consisted of an unbalanced number of men and women from various age groups and the mean comparison suggested significant differences between the genders and the ages. Nevertheless, the results remained the same when gender and age were controlled for. Further studies should examine possible differences. Comparison of means analysis also

revealed significant differences between the participants from the two schools, which, however, did not significantly change correlations or the predictability of the model. The four multivariate outliers suggested that the school might be a latent variable. The two schools seemed to attract different adult populations: the first school educates professionals and the second school prepares adults for successful university education, and additional studies could further explore creativity differences between different adult populations.

Lastly, the data was collected using paper/pencil questionnaires, which has to be considered when interpreting the results. Caution has to be applied upon drawing conclusions given that the study did not include experimental data, thus the possibility that the observed differences were caused by uncontrolled factors cannot be rejected. The results of the present study would benefit from being repeated with an experimental design.

### **Conclusion**

The present study investigated a model encompassing psychological safety, ambiguity tolerance, playfulness and creativity. The relationship reported here confirms the theoretical association of psychological safety with creativity and ambiguity tolerance with playfulness. The findings of the present study add to the knowledge of creativity, playfulness, ambiguity tolerance and psychological safety, even though the relationships within the full model were not all confirmed by the data. Although the interpretation of these results is limited by the nature of the measures and the analysis, this research further emphasizes the significance of psychological safety in our understanding of creativity and sheds light on the connection between ambiguity tolerance and playfulness.

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## Footnotes

The removed items in English:

<sup>1</sup> At work I am: Unengaged-Very engaged; C= -0.165

At work I am: Serious-Playful; C=0.229

<sup>2</sup> I enjoy tackling problems that are complex enough to be ambiguous. C=0.220

I generally prefer novelty over familiarity. C=0.194

I prefer a situation in which there is some ambiguity. C=0.166

<sup>3</sup> People on this team sometimes reject others for being different. C=0.139

It is difficult to ask other members of this team for help. C=0.242

Working with members of this team, my unique skills and talents are valued and utilized.

C=0.220

Appendices

Appendix A Work Climate Questionnaire English version

Tick the answer that best matches your experience of your work situation and workgroup.

The social work climate:	Dislike	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Like
As a workgroup we are:	Non-productive	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Productive
At work I am:	Unengaged	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Very engaged
Our meeting climate is characterized by:	Closed/secret	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Openness
Group cooperation is:	Poor cooperation	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Good cooperation
Group creativity is:	Low creativity	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	High creativity
Our workgroup is:	Boring	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Fun
Participation in the group is:	Low participation	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	High participation
The atmosphere at work is:	Formal	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Non-formal
My coworkers are:	Not open for new ideas	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Welcome new ideas
At work I am:	Serious	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Playful
At work I feel:	Not creative	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Creative
The group is mostly:	Unengaged	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Very engaged
The group is mostly:	Non-playful/serious	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Playful
I feel happiness at work:	Low happiness at work	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	High happiness at work

## Appendix B Work Climate Questionnaire Swedish version

Kryssa för det svar som mest stämmer överens med din upplevelse av din arbetsituation och arbetsgrupp.

Den sociala arbetsmiljön:	Ogillar	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Gillar
Som arbetslag är vi:	Icke-produktiva	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Produktiva
På jobbet är jag:	Oengagerad	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Mycket engagerad
Våra arbetsmöten präglas av:	Slutenhet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Öppenhet
Gruppens samarbete:	Dåligt samarbete	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Bra samarbete
Gruppens kreativitet:	Låg kreativitet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Hög kreativitet
I vår arbetsgrupp har vi:	Tråkigt	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Roligt
Delaktigheten i gruppen är:	Låg delaktighet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Hög delaktighet
Stämningen på jobbet är:	Formell	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Icke-formell
Mina arbetskamrater är:	Icke-nyttänkande	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Välkomnar nyttänkande
På jobbet är jag:	Seriös	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Lekfull
På jobbet känner jag mig:	Icke-kreativ	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Kreativ
Arbetsgruppen är oftast:	Oengagerad	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Mycket engagerad
Gruppen är oftast:	Seriös	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Lekfull
Jag upplever arbetsglädjen:	Låg arbetsglädje	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Hög arbetsglädje



## Appendix C Short Measure of Adult Playfulness English version

Answer the questions by choosing: 1 = strongly disagree

5 = strongly agree

I am a playful person.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Good friends would describe me as a playful person.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I frequently do playful things in my daily life.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
It does not take much for me to change from a serious to a playful frame of mind.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Sometimes, I completely forget about the time and am absorbed in a playful activity.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Appendix D Short Measure of Adult Playfulness Swedish version

Frågorna besvaras med en siffra: 1 =håller inte alls med

5 = håller med helt och hållet

Jag är en lekfull person.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Mina vänner skulle beskriva mig som en lekfull person.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag gör ofta lekfulla saker i min vardag.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Det är inte svårt för mig att växla från en seriös till en lekfull inställning.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Ibland tappar jag helt bort tiden när jag går in i en lekfull aktivitet.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Appendix E Multiple Stimulus Types Ambiguity Tolerance Scale-II English version

Answer the questions by choosing: 1 = strongly disagree

5 = strongly agree

I don't tolerate ambiguous situations well.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I would rather avoid solving a problem that must be viewed from several different perspectives.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I try to avoid situations that are ambiguous.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I prefer familiar situations to new ones.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Problems that cannot be considered from just one point of view are a little threatening.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I avoid situations that are too complicated for me to easily understand.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I am tolerant of ambiguous situations.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I enjoy tackling problems that are complex enough to be ambiguous.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I try to avoid problems that don't seem to have only one "best" solution.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I generally prefer novelty over familiarity.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I dislike ambiguous situations.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I find it hard to make a choice when the outcome is uncertain.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I prefer a situation in which there is some ambiguity.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Appendix F Multiple Stimulus Types Ambiguity Tolerance Scale-II Swedish version

Frågorna besvaras med en siffra: 1 =håller inte alls med

5 = håller med helt och hållet

Jag har svårt att stå ut med oklara eller otydliga situationer.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag undviker helst att lösa ett problem som behöver ses från flera olika perspektiv.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag försöker undvika mångtydiga situationer.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag föredrar bekanta situationer före nya och obekanta.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Problem som kräver att man funderar på dem från mer än ett perspektiv känns lite olustiga.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag undviker situationer som är för komplicerade för mig att överblicka snabbt.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag hanterar mångtydiga situationer väl.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag gillar att lösa komplexa problem som ger utrymme för tvetydighet.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag försöker undvika att ta mig an problem som inte har en möjlig ”bästa” lösning.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Generellt gillar jag det nya mer än det bekanta.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag gillar inte diffusa situationer.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag tycker att det är svårt att fatta beslut när utfallet är osäkert.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Jag föredrar en situation som är något mångtydig.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Appendix G Team Psychological Safety Scale English version

Answer the questions by choosing: 1 = strongly disagree

5 = strongly agree

If you make a mistake on this team, it is often held against you.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Members of this team are able to bring up problems and tough issues.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
People on this team sometimes reject others for being different.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
It is safe to take a risk on this team.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
It is difficult to ask other members of this team for help.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
No one on this team would deliberately act in a way that undermines my efforts.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Working with members of this team, my unique skills and talents are valued and utilized.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Appendix H Team Psychological Safety Scale Swedish version

Frågorna besvaras med en siffra: 1 =håller inte alls med

5 = håller med helt och hållet

Om man gör ett misstag i arbetsgruppen ligger det ofta en till last.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Kollegorna i arbetslaget känner sig fria att ta upp problem och svåra frågor.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Personer i gruppen kan ibland visa sitt ogillande mot andra för att de är annorlunda.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Det är tillåtet att ta risker i arbetslaget.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Det är svårt att be kollegorna i arbetslaget om hjälp.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Ingen i arbetslaget skulle medvetet göra något som underminerar mitt arbete.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Mina unika kunskaper och färdigheter uppskattas och används i arbetslaget.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

Appendix I List of items from the Work Climate Questionnaire within each concept

Psychological Safety									
The social work climate:	Dislike	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Like
Our meeting climate is characterized by:	Closed/secret	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Openness
Group cooperation is:	Poor cooperation	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Good cooperation
Participation in the group is:	Low participation	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	High participation
Creativity									
Group creativity is:	Low creativity	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	High creativity
My coworkers are:	Not open for new ideas	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Welcome new ideas
At work I feel:	Not creative	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Creative
Playfulness									
Our workgroup is:	Boring	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Fun
The group is mostly:	Non-playful/serious	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Playful